IS 16058 : 2013
(Reaffirmed 2019)

भारतीय मानक

भंडारण अनुप्रयोगों के लिए पुर्नप्रयुक्त प्लास्टिक अपशिष्टों से निर्मित डनेज पैलेट — विशिष्टि

Indian Standard

DUNNAGE PALLETS MADE FROM RECYCLED PLASTIC WASTES FOR WAREHOUSING APPLICATIONS — SPECIFICATION

ICS 55.180.20; 55.220; 83.140.01

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Freight Containers and Pallets Sectional Committee, TED 12

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Freight Containers and Pallets Sectional Committee had been approved by the Transport Engineering Division Council.

The purpose of this standard is to lay down specification for dunnage pallets made from recycled plastic waste. These pallets are different from poly pallets for bag storage godowns in way that they are made up of sheets of recycled plastic waste and no reinforcement is required in the pallets.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 ‘Rules for rounding off numerical values (*revised*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

DUNNAGE PALLETS MADE FROM RECYCLED PLASTIC WASTES FOR WAREHOUSING APPLICATIONS — SPECIFICATION

1 SCOPE

This standard specifies the dimensions, requirements of materials and construction and tests for dunnage pallets used in warehouses/godowns for stacking of food grain bags for providing protection against floor moisture and bio-degradation and forth aeration of stored items.

2 REFERENCES

The following standards contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed below:

IS No.	*Title*
3971 : 2005	Pallets for materials handling — Vocabulary
6760 : 1972	Slotted countersunk head wood screws
14535 : 1998	Recycled plastics for the manufacturing of products — Designation

3 TERMINOLOGY

For the purpose of this standard, the definitions given in IS 3971 and the following shall apply.

3.1 Top Member/Deck — Reinforced thermoplastic composite board made from recycled waste plastics shall be used for forming the top member/deck which shall be remain in contact with the storage bags.

3.2 Bottom Section — Reinforced thermoplastic composite board made from recycled waste plastics shall be used for forming the bottom sections which shall be remain in contact with the floor surface.

4 MATERIALS

4.1 Reinforced thermoplastic composite board made from recycled waste plastics like low density polyethylene, high density polyethylene, waste paper and other natural ingredients. The raw material shall be properly graded as per the grading system given in IS 14535.

4.2 Screws

Wood screws as per IS 6760 of the following specifications shall be used for fastening together various planks of top and bottom members of the pallets:

Length : 70 mm
Shank diameter : 12 mm

5 DIMENSIONS

5.1 Dimensions of the top deck shall be as given in Table 1.

5.2 Dimensions of the bottom section shall be as given in Table 2.

6 CONSTRUCTION

6.1 The top and bottom decks of the pallet shall be fabricated from the material described in **4.1** (*see* Fig. 1).

6.2 The gap among the various scantlings shall be such that the feet of workers should not sink into it while standing on the pallet. The top scantlings shall be screwed to the bottom scantlings to form a rectangular rigid pallet. There shall be three screws at four corner joints and two screws at all other joints. In all 34 screws shall be used for the fabrication of one pallet and driven without causing splitting of the scantlings. The nails shall be driven 3 mm inside the poly-sheets and heat fixed to ensure that the heads do not protrude on the surface.

7 WORKMANSHIP

Each screw shall be clinched not less than 55 mm and flushed with the bottom surface of scantlings (*see* Fig. 2).

8 FINISH

Each pallet shall be free from any visual defects like cracks, deformations, uneven surfaces, etc.

Table 1 Dimensions of Top Deck

(*Clause* 5.1)

All dimensions in millimetres.

Sl No. (1)	Size Length × Breadth (2)	Length (3)	Breadth (4)	Height (5)	Thickness (6)	Width of Each Plank (7)	Total No. of Planks (8)	Gap Between the Planks (9)
i)	1 500 × 600	1 500 ± 5	600 ± 5	104 ± 5	18 ± 5	176 ± 1	7	45 ± 1
ii)	1 500 × 900	1 500 ± 5	900 ± 5	104 ± 5	18 ± 5	176 ± 1	7	45 ± 1
iii)	1 200 × 600	1 200 ± 5	600 ± 5	104 ± 5	18 ± 5	170 ± 1	6	36 ± 1
iv)	1 200 × 900	1 200 ± 5	900 ± 5	104 ± 5	18 ± 5	170 ± 1	6	36 ± 1

Table 2 Dimensions of Bottom Section

(*Clause* 5.2)

All dimensions in millimetres.

Sl No. (1)	Size Length × Breadth (2)	Length (3)	Breadth (4)	Height (5)	Thickness (6)	Width of Each Plank (7)	Total No. of Planks (8)	Gap Between the Planks (9)
i)	1 500 × 600	1 500 ± 5	600 ± 5	104 ± 5	22 ± 5	86 ± 1	4	168
ii)	1 500 × 900	1 500 ± 5	900 ± 5	104 ± 5	22 ± 5	86 ± 1	5	195
iii)	1 200 × 600	1 200 ± 5	600 ± 5	104 ± 5	22 ± 5	86 ± 1	4	168
iv)	1 200 × 900	1 200 ± 5	900 ± 5	104 ± 5	22 ± 5	86 ± 1	5	195

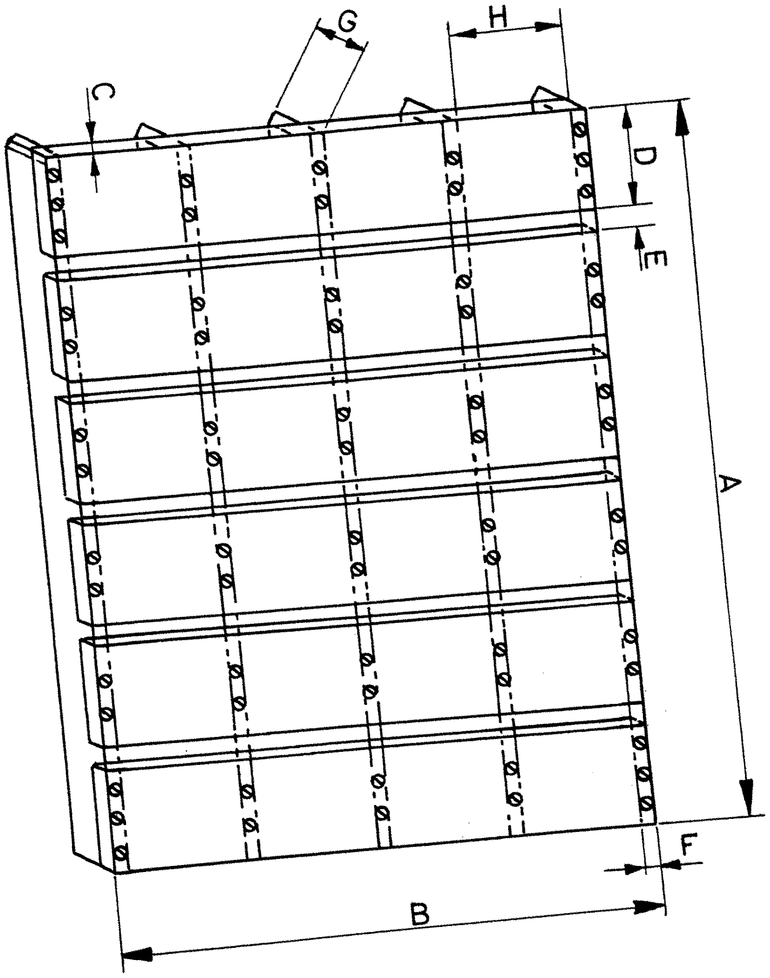

FIG. 1 CONSTRUCTION OF TOP AND BOTTOM DECK

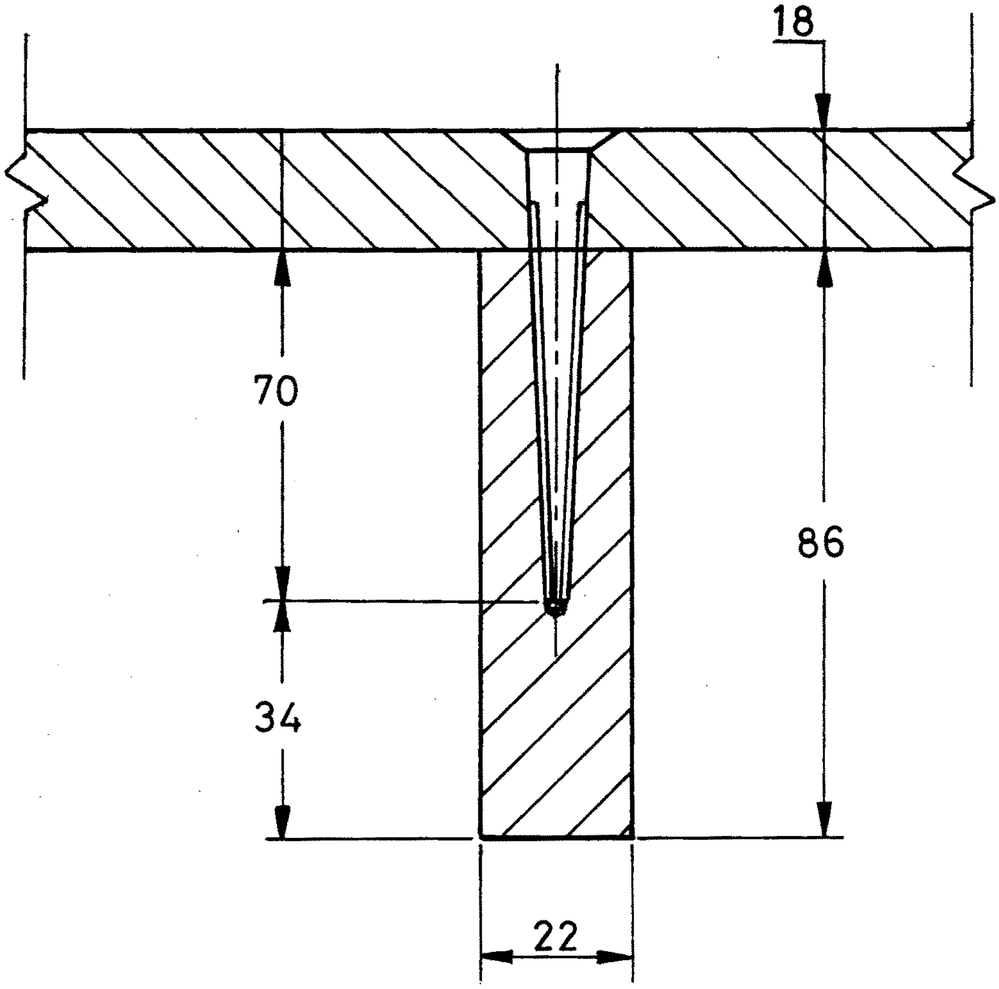

FIG. 2 FASTENING OF JOINTS

9 TESTS

9.1 Type Tests

The following shall constitute the type tests.

9.1.1 *Tests on Top Members/Decks*

The top members shall conform to the requirements of Table 3.

Table 3 Tests on Top Members

Sl No.	Test	Test Specimen	Requirement (*Min*) kgf
(1)	(2)	(3)	(4)
i)	Axial crushing load	40 × 40 × 40 mm	4 000
ii)	Cross-sectional crushing load	40 × 40 × 40 mm	1 250
iii)	Ultimate bending load	300 mm long simply supported at 240 mm	325

NOTE — Rate of loading on Universal Testing Machine shall be 2.8 mm/min.

9.1.2 *Tests on Bottom Sections*

The bottom sections shall conform to the requirements of Table 4.

9.1.3 *Test on Assembled Pallets*

The pallets shall be subjected to the following tests:

a) *Drop test* — Any piece of poly-pallets shall be dropped perpendicularly either vertically or horizontally on hard concrete floor from a height of 6 feet. Poly-pallets shall not break, or crack, or deformed, even no screw shall come out from the pallet for such fall.

b) *Handling or throwing test* — Any pallet shall be thrown at random over a distance of 4 feet to 8 feet or any further distance as possible by human being in a fashion so that top member is crashed on the floor. Poly-pallets shall not break, or crack, or deformed, even no screw shall come out from the pallet for such throw.

c) *Hammer test* — A dead weight iron of 60 kg to be dropped from a height of 6 feet upon a pallet placed horizontally on the solid and even floor. Poly-pallets shall not break, or crack, or deformed, even no screw shall come out from the pallet for such test.

d) *Load bearing test* — At random 8 to 10 bags of each 50 kg weight be dropped one by one from a height of 6 feet upon a poly-pallet placed horizontally on solid and even floor. The pallet shall withstand the load and it shall not break, or crack, or deformed. No screw shall come out from the pallet for such load.

Table 4 Tests on Bottom Members

(*Clause* 9.1.2)

Sl No. (1)	Test (2)	Requirement (3)
i)	Shear strength (*Min*), kgf/cm^2	60
ii)	Ultimate tensile strength (*Min*), kgf/cm^2	84
iii)	Elongation (*Min*), percent	6
iv)	Impact strength notched specimen (*Min*), kgf.cm	6
v)	Thermal stability (linear expansion, *Max*), percent 24 h at 80°C on 80 mm gauge length	1.5
vi)	Water absorption (*Max*), percent	0.5
vii)	Chemical resistance (weight increase, *Max*, percent), to:	
	a) Hydrochloric acid	0.3
	b) Sodium hydroxide solution	0.8
	c) Toluene	4.0
viii)	Bend strength at yield (*Min*), kgf/cm^2	130
ix)	Compressive strength at 10 percent, deformation (*Min*), kgf/cm^2	140

NOTE — For test methods, suitable standard as agreed to between the supplier and the purchaser shall be referred.

9.2 Routine Test

Every poly-pallet, after completion shall be tested for the following routine tests at the manufacturers works:

a) Dimensions;
b) Construction; and
c) Finish.

9.3 Acceptance Test

If the purchaser desires any of the (production) routine tests to be repeated at the time of purchase, where agreed to between the purchaser and the manufacturer. The tests may be carried out at the manufacturer's works, alternatively, the tests may be repeated at the place specified by the purchaser provided all the arrangements for the tests are made by the purchaser at the specified place.

9.4 Samples for Tests

9.4.1 *Type Tests*

One out of every 500 poly-pallets of the same type shall constitute a type test sample and shall be picked up at random from the stock of assembled poly-pallets that have already been subject to the production routine tests.

9.4.2 *Acceptance Test*

The number of samples shall be as agreed to between the purchaser and the manufacturer.

10 DELIVERY

Unless otherwise specified, the pallets should be delivered in a complete assembled form.

11 MARKING

Each poly-pallet shall be clearly marked with the following:

a) Manufacturer's name or identification mark;
b) Month and year of the manufacture; and
c) Batch number.

12 BIS CERTIFICATION MARKING

Each pallet may also be marked with the Standard Mark.

12.1 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act*, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the license for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

Bureau of Indian Standards

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Amendments Issued Since Publication

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